TR0329M-EVB-B

Application Note 2300MHz~2700MHz 5.0V 90mA-HG mode 5.0V 45mA-LG mode

Rev-1.0

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1. GENERAL DESCRIPTION

The he TR0329M is a high-linearity, ultra-low noise 2-stage gain block amplifier module with internal 50ohm input output matching with a bypass mode functionality integrated to the second stage in the product. At 2.5 GHz, the amplifier, under high gain mode, typically provides 37dB gain, +31dBm OIP3, and 0.5 dB noise figure while drawing 90 mA current from a +5 V supply. The component also provides high performance in the low gain mode with 17dB gain, 0.6dB noise figure and +21dBm OIP3 while drawing 50 mA current. The TR0329M is packaged in a compact, low-cost Quad Flat No Lead (QFN) 3.5x3.5x0.75mm, 20 pin plastic packages

TR0329M-EVB-B is an evaluation board specially tuned for frequency range of 2300MHz~2700MHz applications. Its application in the areas of Wireless infrastructure, TDD massive multiple input & multiple output, active antenna systems, TDD-based communication systems etc.

TR0329M-EVB-B Board Design

2. TR0329M-EVB-B SCHEMATIC

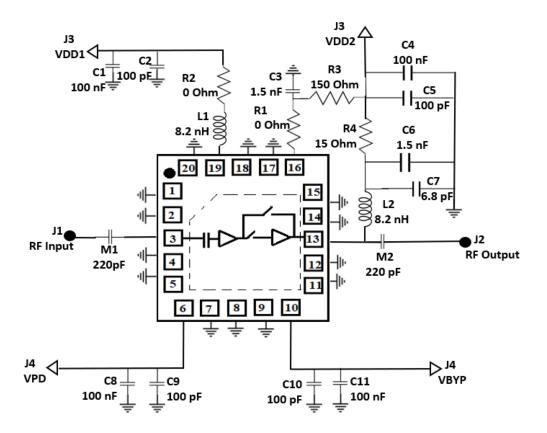


Figure 1 TR0329M-EVB-B 2300MHz ~ 2700MHz schematic



3. TR0329M-EVB-B LAYOUT

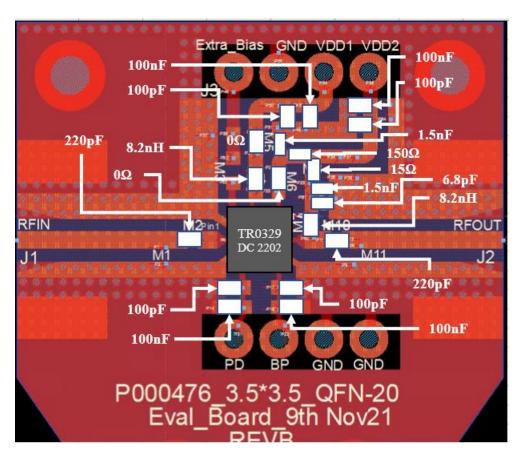


Figure 2 TR0329M-EVB-B 2300MHz ~ 2700MHz layout

4. TR0329M-EVB-B BILL OF MATERIAL

Component ID	Value	Manufacturer	Recommended Part Number	Qty
R1, R2	Ω	Panasonic	ERJ-2GE0R00X	2
C7	6.8pF	Murata	GJM1555C1H6R8BB01D	1
M2	220pF	Kemet	C0402C221K5GACAUTO	2
C2, C5, C9, C10	100pF	AVX	04025A101JAT4A	4
C1, C4, C8, C11	100nF	TDK	C1005X7R1H104K050BE	4
L1, L2	1.5nF	Murata	04025C152JAT2A	2
R4	15 Ω	Panasonic	ERJ-H2RD15R0X	1
R3	150Ω	Panasonic	ERJ-2RHD1500X	1
C3, C6	8.2nH	Coil craft / Wurth Electronics	0402HP-8N2XGE / 744916082	2
PCB		Rogers RO4350B	1	



5. TR0329M-EVB-B BOARD MEASUREMENT RESULTS

5.1. TR0329M-EVB-B TEST RESULTS

All the tests are carried out at room temperature.

5.2. Summary

Parameter	Test Condition	Typical Values	Unit	
Operational frequency Range		2.3-2.7	GHz	
Gain	HG	37-36.8	dB	
Gain	LG	18-16.7	dB	
Noise Figure (De-embedded)	HG	0.5-0.6	dB	
Noise Figure (De-embedded)	LG	0.5-0.6	dB	
EVP Noise Figure	HG	0.6-0.7	dB	
EVB Noise Figure	LG	0.6-0.7	dB	
Input Poturn I occ	HG	Less than -11	dB	
Input Return Loss	LG	Less than -11	dB	
Output Datum Loca	HG	Less than -11	dB	
Output Return Loss	LG	Less than –5.5	dB	
ODIAD	HG	17-18.5	dBm	
OP1dB	LG	10-12	dBm	
OID2 (With 1MHz tone engine)	0dBm per tone,	30-31	dBm	
OIP3 (With 1MHz tone spacing)	-2dBm per tone,	21-23	dBm	
	HG	90	mA	
Current, Id	LG	45		
	PD	5		
Isolation between RFIN and RF-out			dB	
PD mode ON and Bypass ON	At 2.5GHz	55		
Isolation between RFIN and RF-out PD mode ON and High Gain ON	Receive operation	33	dB	

Figure 3 TR0329M-EVB-B Electrical Characteristics Summary



5.3. S parameters.



Figure 4.a. S parameters of HG mode of TR0329M-EVB-B



Figure 4.b. S parameters of LG mode of TR0329M-EVB-B



5.4. De-embedded Noise Figure.

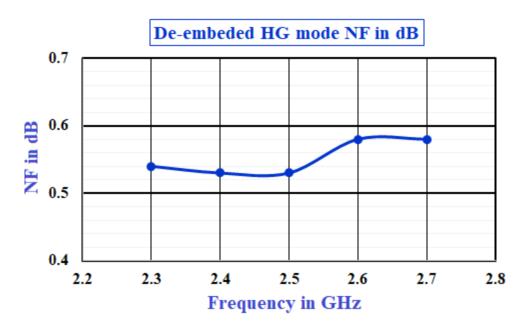


Figure 5.a. De-embedded NF of HG mode of TR0329M-EVB-B

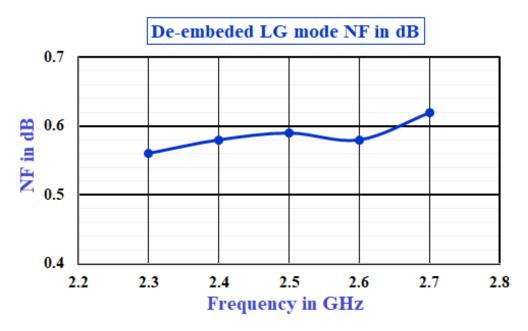


Figure 5.b. De-embedded NF of LG mode of TR0329M-EVB-B



5.5. Large Signal Test Results.

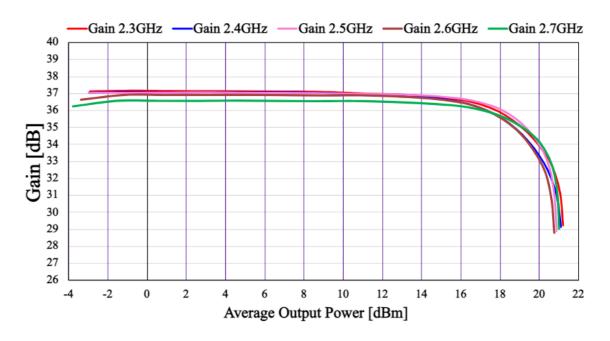


Figure 6.a. Gain Vs Pout of HG mode of TR0329M-EVB-B

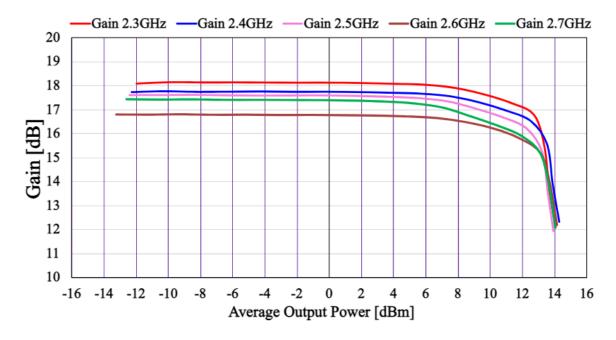


Figure 6.b. Gain Vs Pout of LG mode of TR0329M-EVB-B

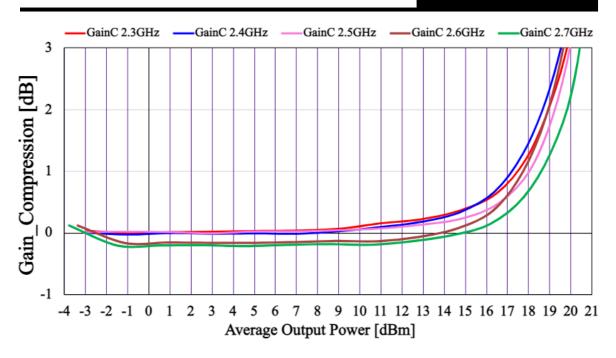


Figure 7.a. Gain compression Pout of HG mode of TR0329M-EVB-B

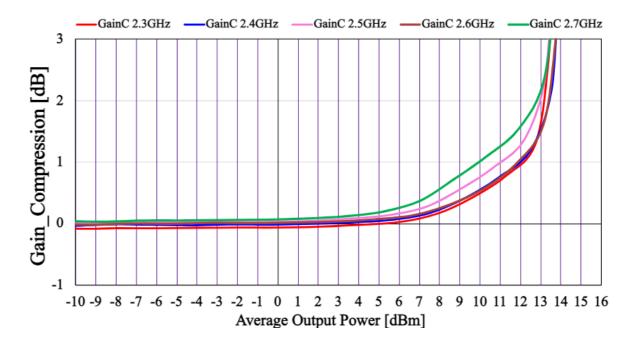


Figure 7.b. Gain compression Pout of LG mode of TR0329M-EVB-B



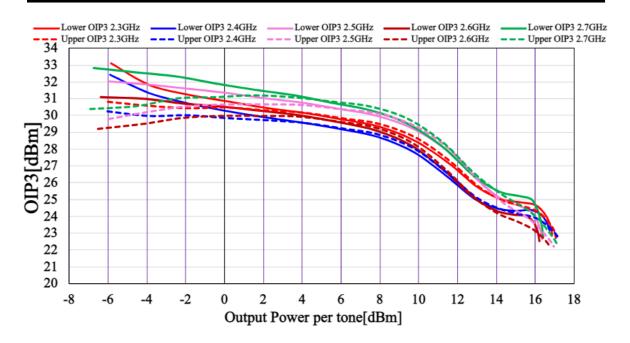


Figure 8.a. OIP3 Vs Pout per tone of HG mode of TR0329M-EVB-B

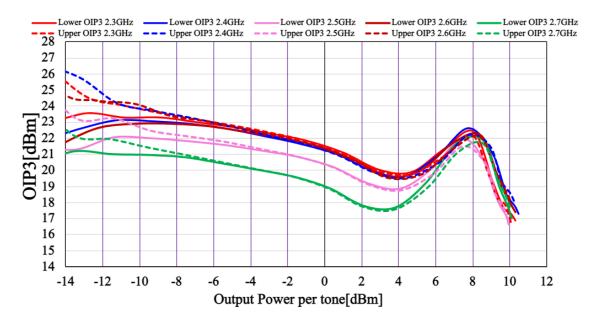


Figure 8.b. OIP3 Vs Pout per tone of LG mode of TR0329M-EVB-B

